



## Full length article

# Empathy and embodied experience in virtual environment: To what extent can virtual reality stimulate empathy and embodied experience?



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## ABSTRACT

This study investigates the user experience to clarify what it is like to experience stories in VR (virtual reality) and how immersion influences story experiences in immersive storytelling. This study explores the immersive storytelling context, developing and testing a VR experience model that integrates presence, flow, empathy, and embodiment. The results imply that users' personal traits correlates immersion in VR: user experience in VR depend on individual traits, which in turns influence how strongly users immerse in a VR. The way users view and accept VR stories derives from the way they envisage and intend to experience them. Rather than simply being influenced by technological features, users have intentional and purposeful control over VR stories. The findings of this study suggest that the cognitive processes by which users experience quality, presence, and flow determine how they will empathize with and embody VR stories.

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Virtual reality (VR) is often used in storytelling. As it is considered an effective medium for interactive storytelling, the industry seems keen to introduce an interactive element into every VR piece. VR storytelling allows the user to enter a virtually recreated scenario that represents a story. Stories are produced as computer graphic virtual environments, which can be inserted into online virtual worlds and watched either conventionally on a monitor, or via fully immersive systems such as head-tracked display. VR is redefining the rules around narrative structure, character development, and storytelling. The goal of VR storytelling is to tell a story that will stimulate emotions that will influence action (Shin, 2017). The VR and storytelling industries, taken together, expect the availability of VR devices to improve user experiences (UXs) because higher levels of immersion or presence will enable users to experience the feeling of being in another location while watching content and using services (McMahan, Lai, & Pal, 2016).

Despite high expectations and popularity, it remains unclear whether users genuinely feel presence and flow during immersive

experiences, whether immersion influences cognition, and in what ways the UX is improved by new forms of heightened immersion. Although the word is widely used, "immersion" has not been precisely defined or explained with users. This term has become even more ambiguous in the emerging domain of VR storytelling. It is therefore unclear whether immersion has an impact on the degree to which users assign meaning to stories (empathy) or to objects encountered in a mediated environment (embodied cognition). To ensure a successful rollout of VR storytelling, it is critical to understand how users perceive the value of a VR story, how empathies are formed, how value perceptions influence action, and what users appreciate about their experiences at an underlying level. To ensure that a future rollout of VR is successful, it is important to understand how average users encounter VR stories and how they react overall. To address this issue, the present study tests a VR experience model on four different groups, examining how the immersion and empathy tendencies influence and/or are influenced by presence and flow in the VR story process. By exploring users' cognitive processes, this study aims to determine what it is actually like to experience a story in VR, focusing on the following research questions (RQs):

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**RQ1.** How does immersion relate to human traits of empathic behavior in VR stories?

**RQ2.** How do the human tendencies of immersion and empathy perceive presence and flow differently?

**RQ3.** How do users perceive immersion and how does immersion influence empathy in VR stories?

The findings in this study suggest that immersive interfaces do not necessarily enhance the sense of engagement or satisfaction (e.g., Hamari et al., 2016; Trentini, 2015). Instead, these findings highlight a new role for immersion, as redefined through user responses. The meaning of immersion depends on user traits and contexts; the function of immersion is strongly dependent on user sense-making and intention (Reinhard & Dervin, 2012). While this argument is similar to the one by Weibel, Wissmath, and Mast (2010), which confirmed the correlation of user personality and immersion in general VR, this study focuses on the specific user traits (empathy) and particular storytelling consumption context. In doing so, it examines how engagement converges and diverges, exploring the qualities that define VR and make it a uniquely engaging experience.

Users view and accept VR stories in the way they imagine and want to experience them. Although providers design VR constructs and develop stories, ultimately, it is the users who must engage with those stories. This argument highlights the active aspects of immersion and its dynamic relationship with user cognition. The importance of immersion mainly comes from user cognition, rather than being pre-embedded within technological properties or existing (separate) entities (e.g., Shin, 2016).

The results of this study contribute to ongoing research in two aspects. First, the VR model advances current immersion research and the user research by identifying key variables (immersion) and clarifying their underlying relations. As VR storytelling rapidly develops, traditional technology-based frameworks must be modified to reflect the heterogeneous and complex nature of user preferences. Although the concept of immersion is widely used to describe VR, it is not clear what immersion is—or how people actually experience it. In the VR context, a series of questions remains unanswered, regarding how users feel about the stories they experience via VR, how immersion influences performances and values, and how users react to their VR experiences. This study clarifies the cognitive processes of users, i.e., how they perceive technological properties, how immersion elicits user confirmation, and how technological cues trigger empathy and embodied experiences. It concludes that user roles are active in adopting, consuming, and experiencing VR stories. These arguments have implications for heuristic-based usability and users' cognition-evaluations, which enable us to make meaningful claims about the VR implications of UX frameworks (e.g., Bailey, Bailenson, & Casasanto, 2016).

Second, this study can provide guidance on interaction and interface design for VR and related virtual services. The findings offer practical guidelines that can help VR industries develop storytelling service evaluation frameworks capable of determining the adoption potential of new VR-related services. The industry is working to ensure that content is more enjoyable and engaging (Aronson-Rath, Milward, Owen, & Pitt, 2015). As VR content clearly represents a specific market segment (Bachen, Ramos, Raphael, & Waldron, 2016), a thorough user analysis is essential for achieving successful implementation and diffusion (Shin, 2016). The cognitive model derived from this study can be used to develop such a framework; it can be applied to services that are primarily functional, as well as to those that are specifically directed at user motivations and attitudes. The findings of this study should be useful to firms attempting to increase VR adoption and to

understand the factors affecting attitudes and intentions. The results should prove valuable for market researchers engaged in VR and storytelling, as they face the challenge of developing improved immersion and empathy indicators on which to base numerous user-based interaction and interface design decisions. The key to developing great VR stories is the medium's adoption by consumers, something that may be difficult to achieve.

## 1. Literature review

### 1.1. Virtual reality storytelling

VR is a computer-generated experience that can simulate physical presence in real or imagined environments (Kerrebrock, Brengman, & Willems, 2017). The wide diffusion of VR technologies has created a trend: delivering stories through VR. VR has the potential to support incredibly complex narratives, tailored to promote complex viewer interactions. Put simply, users feel they are present in VR; they are dropped right into a scene, as if they were part of the story. Immersion and presence are terms used to describe an experience in which the line between reality and imagination is blurred. Reactions to stories are much more emotional. People get sick during fast motion videos and horror stories filmed in 360°. Yet storytelling in VR is much more than just getting out of the way when taking a 360-degree shot. With VR, users have a 360-degree canvas to step into, instead of passively watching a narrative unfold from outside the frame. This new canvas has the potential to make storytelling truly immersive—but it is no easy feat to design stories for this type of experience.

VR has become a popular means of telling stories and bringing the world closer to audiences. VR storytelling can be an effective tool for sharing experiences. In a virtual environment, viewers who are close to characters, and sharing the same space, may feel their emotions or situations more strongly. To absorb oneself in VR can stimulate empathy. Stimulated empathy with others in VR can make the virtual environment seem more realistic to users. *The New York Times*, for example, created a VR project on child refugees: *The Displaced* (Fig. 1). Paired with photographs and text were VR video portraits of three refugee children in South Sudan, Ukraine, and Lebanon. Instead of taking audience members from one place

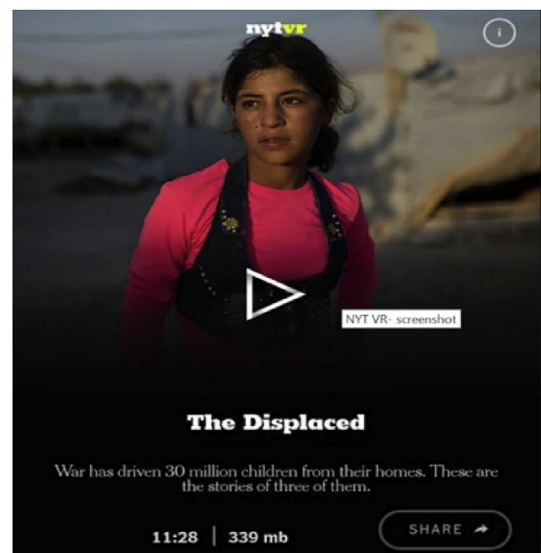


Fig. 1. *The Displaced* virtual reality film (from New York times VR).

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